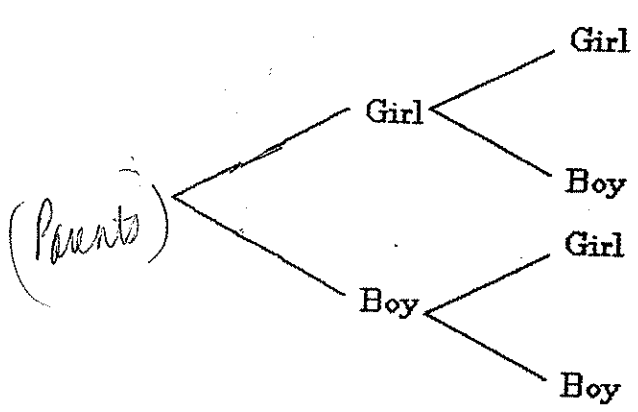


1. A die is rolled 12 times and a 3 comes up  $\frac{2}{12} = \frac{1}{6}$  times. How does the theoretical probability compare to the experimental probability?
- A The theoretical probability equals the experimental probability.
- B The theoretical probability is greater than the experimental probability.
- C The theoretical probability is less than the experimental probability.
- D You cannot tell how the theoretical probability compares to the experimental probability.
- $\frac{1}{6} \times \frac{12}{1} = 2$  times T.P.

2. If you flip a coin 10 times and get heads 7 times, how does this compare with the number of heads you should expect to get when flipping a coin 10 times? T.P. =  $\frac{5}{10}$  E.P. =  $\frac{7}{10}$
- A It is exactly what I should expect.
- B It is more than I should expect.
- C It is less than I should expect.
- D There is no way of telling how many to expect.

3. The tree diagram shows the possibilities for boys and girls in a two-child family. If a family has 2 children, what are the chances that one child is a girl and one child is a boy?



- A  $\frac{1}{4}$
- B  $\frac{1}{3}$
- C  $\frac{1}{2}$
- D 3

4. Tina had to buy a new gym uniform. She had a choice of either red, blue or green shorts, shirts and pairs of socks. How many different outfits can she choose from?
- A 9
- B 12
- C 27
- D 81
- $3 \times 3 \times 3$

5. At the Pizza Tower, you can order any of the following toppings for your pizza:

Pizza Toppings

Vegetarian Toppings	Meat Toppings
Mushroom	Sausage
Green Pepper	Hamburger
Onion	Pepperoni
Broccoli	Bacon

- Gretchen and Willie agreed to get a pizza with one vegetarian topping and one meat topping. How many different choices do they have?

- A 7
- B 8
- C 12
- D 16
- $4 \times 4$

6. Dawn has 3 skirts and 5 blouses. How many different skirt-blouse outfits can she make with these?
- A 3
- B 5
- C 8
- D 15
- $3 \times 5$

7. Using the letters A, B, C, and D only once in each combination, how many 3-letter combinations are there?

- A 4
- B 8
- C 16
- D 24

$4 \times 3 \times 2$  order matters

8. How many different 4-digit mailbox numbers can be made by using all 4 of these numbers: 2, 4, 6 and 8?

Assume that each digit is used exactly once in each mailbox number.

A 6

B 16

C 24

D 64

$$4! \quad 4 \times 3 \times 2 \times 1$$

9. Joe has a stack of 5 CDs. There is rock music on 3 CDs and country music on the other 2 CDs. Suppose Joe takes one CD from the stack without looking. What is the probability that he would pick a country music CD?

A  $\frac{1}{5}$

B  $\frac{2}{5}$

C  $\frac{3}{5}$

D  $\frac{5}{5}$

10. There are 6 red marbles, 3 green marbles, and 1 blue marble in a jar. The marbles are all the same, except in color. William reaches in the jar without looking and picks one marble.

What is the probability that he will select a green marble?

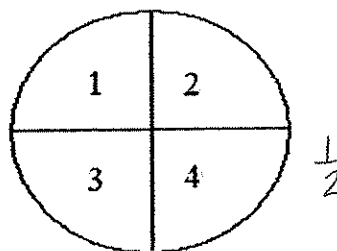
A  $\frac{1}{3}$

B  $\frac{3}{10}$

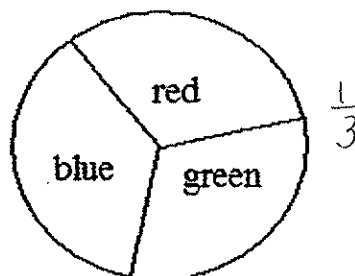
C  $\frac{1}{10}$

D  $\frac{3}{7}$

11. Using the spinners below what is the probability of the spinner landing on an odd number and the color red?



$$\frac{1}{2}$$



$$\frac{1}{3}$$

A  $\frac{1}{6}$

$$\frac{1}{2} \times \frac{1}{3}$$

B  $\frac{2}{7}$

C  $\frac{1}{12}$

D  $\frac{1}{16}$

12. If a coin is flipped and a 6-sided die (with numbers 1 through 6 on it) is rolled, what is the probability of flipping heads on the coin and rolling a 3 on the die?

A  $\frac{1}{2}$

B  $\frac{1}{6}$

C  $\frac{1}{8}$

D  $\frac{1}{12}$

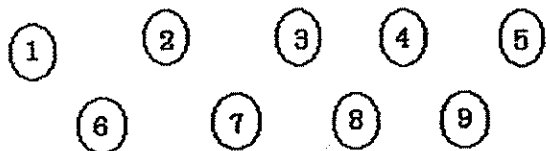
$$\frac{1}{2} \times \frac{1}{6}$$

Willie's piggy bank contains 5 quarters, 16 dimes, 4 nickels, and 25 pennies. Willie shakes out one coin at a time from his bank. What is the probability that he will shake out a quarter followed by a penny?

- The
- A about 2%
- B about 5%
- C about 6%
- D about 30%.

$$\frac{5}{50} \times \frac{1}{25} = \frac{5}{98}$$

4. The nine chips shown below are placed in a bag and then mixed up.



What is the probability that Madeline will draw an even number chip then an odd number chip from the bag without replacing them?

- as 2 A  $\frac{20}{72}$

B  $\frac{25}{72}$

C  $\frac{20}{81}$

D  $\frac{25}{81}$

$$\frac{4}{9} \times \frac{5}{8} = \frac{5}{18} \Rightarrow \frac{20}{72}$$

15. A box contains 20 marbles of which 2 are white, 7 are red, and 11 are blue. What is the probability of pulling a red, then a blue marble (without replacing any) from the box?

A  $\frac{18}{40}$

B  $\frac{77}{380}$

C  $\frac{18}{380}$

D  $\frac{77}{440}$

$$\frac{7}{20} \times \frac{11}{19} = \frac{77}{380}$$

16. We have 9 cards numbered 1 through 9 and a bag containing 4 green marbles, 2 red marbles, and 6 blue marbles. If we randomly pick a card and pick a marble from the bag, what is the probability that we will get a card with a number less than 4 and a green marble?

A  $\frac{1}{9}$

B  $\frac{2}{3}$

C  $\frac{4}{27}$

D  $\frac{1}{6}$

$$\frac{3}{9}$$

$$\frac{4}{12} = \frac{1}{3}$$

$$\frac{3}{9} \times \frac{1}{3} = \frac{1}{9}$$

1. Ten teachers met at a mathematics conference. Each teacher shook the hand of each of the other teachers exactly once. How many handshakes were there?

A 100

B 55

C 45

D 11

*tree diagram on back page*

*Must show problem*

$$10C_2 = \frac{10 \cdot 9}{2 \cdot 1} = \frac{90}{2} = 45$$

2. Kevin and four friends want to play a game. Only three people may play at a time. How many different combinations of three players are possible?

A 60

B 30

C 15

D 10

*5C3*

$$\frac{5 \cdot 4 \cdot 3}{3 \cdot 2 \cdot 1} = 10$$

3. The basketball team needs to select uniforms. They have the following choices:

<b>Shirts</b>	Red, White, Black
<b>Shorts</b>	Red, White, Black
<b>Shoes</b>	High Tops, Medium Tops, Low Tops

How many uniform combinations are possible?

A 3

B 9

C 27

D 81

$$3 \times 3 \times 3$$

4. A fair coin is tossed 3 times. What is the probability that the coin will land showing heads on all three tosses?

A  $\frac{1}{9}$

B  $\frac{1}{8}$

C  $\frac{1}{6}$

D  $\frac{1}{3}$

$$\frac{1}{2} \times \frac{1}{2} \times \frac{1}{2}$$

H T T

- how tails?
- $$\begin{array}{c}
 H \\
 \swarrow \quad \searrow \\
 H \quad T \\
 \swarrow \quad \searrow \\
 H \quad T
 \end{array}$$
- $$\begin{array}{c}
 H \quad H \quad H \\
 H \quad H \quad T \\
 H \quad T \quad H \\
 H \quad T \quad T
 \end{array}$$

- $$\begin{array}{c}
 H \\
 \swarrow \searrow \\
 T < H < T \\
 \swarrow \searrow \\
 T < H \\
 \swarrow \searrow \\
 T < H \\
 \swarrow \searrow \\
 T < H
 \end{array}$$

8 outcomes

- |   |    |
|---|----|
| A | 21 |
| B | 35 |
| C | 45 |
| D | 70 |

$$\frac{6}{36} = \frac{1}{6} \times 210$$

7. Students made a chart showing the colors and sizes (of 62 birds) they saw at a zoo.

	Size		
Main Color	Small	Medium	Large
Blue		3	
Gray		8	4
White	7	2	4
Black	10	9	6
Red		3	2
Brown		1	3

$$\frac{6}{62} = \frac{3}{31}$$

8. Matt has a bag containing 12 green marbles and 8 blue marbles. Without looking, he pulls out one marble and places it on a table. He then picks a second marble from the bag. What is the probability he will have 2 blue marbles?

A  $\frac{8}{20} \cdot \frac{7}{19}$

$\frac{8}{20} \cdot \frac{7}{19}$

B  $\frac{8}{20} \cdot \frac{7}{20}$

C  $\frac{1}{8} \cdot \frac{1}{7}$

D  $\frac{1}{8} \cdot \frac{1}{8}$

9. Quinn tosses a fair coin and then rolls a fair number cube with faces labeled 1 through 6. What is the probability that the result will be heads and a number less than 3?

A  $\frac{3}{12}$

B  $\frac{2}{12}$

C  $\frac{2}{16}$

D  $\frac{1}{12}$

$\frac{1}{2} \cdot \frac{2}{6} = \frac{2}{12}$

10. Sam has three quarters, four dimes, two nickels, and one penny in his pocket. If he reaches into his pocket and randomly pulls out one coin, what is the probability that the coin will be a quarter?

A  $\frac{3}{4}$

$\frac{3}{10}$

B  $\frac{3}{7}$

C  $\frac{3}{10}$

D  $\frac{7}{10}$

11. The bags shown below contain red and green marbles. From which bag will student have the greatest probability of randomly picking a red marble?

A



$\frac{5}{9}$

B



$\frac{7}{15}$

C



$\frac{2}{3}$

D



$\frac{14}{29}$

12. A box contains spools of thread. There are 5 red, 6 yellow, and 4 white spools of thread. John picks a spool and keeps it. His spool is not white. Then Sue picks a spool and keeps it. Her spool is not white. It is now Ted's turn to pick a spool from the box. What is the probability that Ted's spool will be white?

A  $\frac{4}{13}$

B  $\frac{4}{15}$

C  $\frac{1}{13}$

D  $\frac{1}{15}$

15 → 14-7

$\frac{4}{13}$

13. Jeanette wants to determine the most popular car in her town. Which plan would give Jeanette the **most accurate** results?

- A Conduct a sample survey of the cars in her school's parking lot at 1:30 on a school day. *only students/teachers*
- B Conduct a random telephone survey of people who live in her state.
- C Conduct a sample survey of the cars that are advertised in the local newspaper.
- ☒ D Conduct a random survey of people entering a large grocery store in her town.

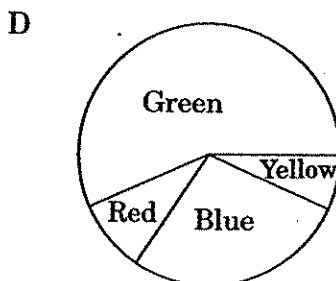
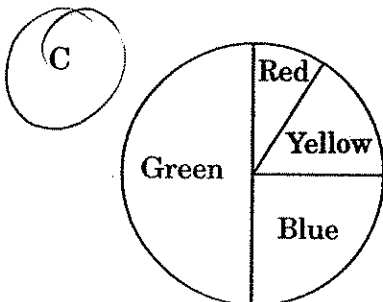
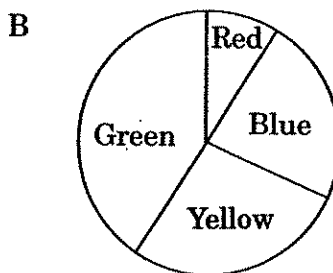
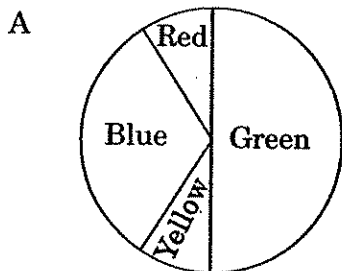
14. The students in Mr. Smith's class play a game using a fair spinner. After spinning, they record the following results:

Yellow	Green	Red	Blue
599	1803	270	928

$\frac{1}{2}$   $\frac{1}{4}$   
 $\cdot 17$   $\cdot 5$   $\cdot 08$   $\cdot 26$

3600

Which spinner was Mr. Smith's class **probably** using?



8. Louis rolled a cube numbered 1 - 6 twelve times and recorded the following results:

6, 3, 1, 1, 6, 5, 4, 2, 3, 3, 1, 3

Which number had an experimental probability equal to the theoretical probability of being rolled?

A) 1

B) 3

C) 4

D) 6

#  
 $1 - 3/12 = 1/4$   
 $2 - 1/12$   
 $3 - 4/12 = 1/3$   
 $4 - 1/12$   
 $5 - 1/12$   
 $6 - 2/12 = 1/6$

9. Charles has 2 dimes, 4 nickels and some quarters in his pocket. If the probability of drawing a quarter from his pocket is  $1/2$ , how many quarters does he have?

$P(Q) = \frac{1}{2}$

$6/d + n$

$\therefore 6Q$

10. Eight teachers shook hands at a math conference. If each teacher shook the hand of all of the other teachers only once, how many handshakes took place?

$8C_2 = \frac{8 \cdot 7}{2 \cdot 1} = \frac{56}{2} = 28$

For Questions 11-13, suppose you toss a coin and roll a 6-sided number cube.

$\frac{1}{2} \times \frac{1}{6}$

11 What is the probability that you toss a head and roll a 3?

A  $\frac{1}{12}$

B  $\frac{1}{6}$

C  $\frac{1}{3}$

D  $\frac{1}{2}$

11 A

12 What is the probability that you toss a head or a tail?

A 0

B  $\frac{1}{4}$

$P(H) = \frac{1}{2}$

$\frac{1}{2} + \frac{1}{2} = 1$

C  $\frac{1}{2}$

D 1

$P(T) = \frac{1}{2}$

12 D

13 What is the probability that you either toss a tail or roll a 7?

A  $\frac{1}{12}$

B  $\frac{1}{6}$

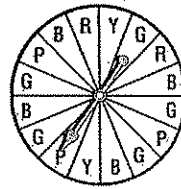
$\frac{1}{2} + 0$

C  $\frac{1}{2}$

D 1

13 C

For Questions 14-16, use the spinner shown in the figure.



14 What is the probability that the spinner lands on red or purple?

A  $\frac{2}{5}$

$\frac{2}{16} + \frac{2}{16} = \frac{4}{16} = \frac{1}{4}$

B  $\frac{3}{8}$

C  $\frac{5}{16}$

D  $\frac{1}{4}$

14 C

15 What is the probability that the spinner lands on yellow or blue?

A  $\frac{2}{5}$

$\frac{2}{16} + \frac{2}{16} = \frac{4}{16} = \frac{1}{4}$

B  $\frac{3}{8}$

C  $\frac{5}{16}$

D  $\frac{1}{4}$

15 B

16 What is the probability that the spinner lands on a section that is not orange?

A 1

B  $\frac{3}{8}$

C  $\frac{5}{16}$

D  $\frac{1}{6}$

16 A

Y - 2  
 G - 2  
 R - 2  
 B - 4  
 P - 3  
 O - 6

Teacher #  
 8 7 6 5 4 3 2 1  
 # Shakes  
 $7 + 6 + 5 + 4 + 3 + 2 + 1 = 28$

Key